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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,086	08/19/2003	Arkady Glukhovsky	P-2388-US1	3064

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EXAMINER	
PRUCHNIC, STANLEY J	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/643,086	GLUKHOVSKY ET AL.	
	Examiner	Art Unit	
	Stanley J. Pruchnic, Jr.	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/806,714.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/22/2005(4sheets)*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08 August 2005 has been entered.

Response to Arguments

2. Applicant's arguments, see the response filed 08 August 2005, with respect to the rejection(s) of Claims 1-12 under 35 USC 103(a), *e.g.,* over US 6641529 B2 (Kuranishi; Hideaki, hereinafter KURANISHI) in view of LIST (US 3882384 A), *etc.,* have been fully considered and are persuasive in view of the amendments to the Claims. Therefore, the rejection(s) have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly cited art and previously cited art.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over **KURANISHI** (U.S. Patent No. 6,641,529 B2) in view of US 6148152 A (Cazier; Robert *et al.*, hereinafter **CAZIER**).

KURANISHI discloses or suggests a method for calculating a temperature change in an environment, the method comprising:

introducing *in-vivo* (Col. 1, Lines 18-25) an image sensor having an image sensing module (CCD 31) at the tip of fiber scope 30 (Col. 4, Lines 6-10), which also includes a lens (Col. 4, Lines 57-65);

KURANISHI further teaches that a sampled dark current of the image sensor introduced *in-vivo* is known to vary in dependence upon the temperature of the body into which the image sensor has been introduced (Col. 2, Lines 57-67);

sensing the dark current noise (Figs. 2-3; *e.g.,* sampled at time t27; stored in memory 11A) of the image sensing module;

obtaining a dark current data sample (and storing in memory 11; *e.g.,* sampled at time t27; stored in memory 11A) as claimed by Applicant in **Claim 1**.

KURANISHI, as described above, does not disclose comparing a dark current data sample of the sensed dark current noise to a previous sample and a step of calculating the temperature change in vivo according to the comparison, as claimed by Applicant in Claim 1.

CAZIER discloses that is known in the art of digital imagers (or imaging cameras) to use the sampled dark current of the imager (*e.g.,* CCD photosensors in a digital camera) for calculating (Col. 2, Line 40) temperature of the camera focal plane (Col. 2, Lines 25-60) and further discloses comparing a dark current data sample (I_c) of the

sensed dark current noise to a previous sample (I_B) and a step of calculating the temperature change according to the comparison.

CAZIER discloses that determining temperature of the camera is advantageous for enabling thermal compensation of the lens system of the imager.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the dark current noise provided in the image sensor introduced *in-vivo* of **KURANISHI** for determining a temperature change by sampling a dark current data sample (I_c) of the sensed dark current noise and comparing the sample to a previous sample (I_B) in order to optimize the focus by thermal compensation of the lens system of the image sensor as taught by **CAZIER**.

OFFICIAL NOTICE is claimed regarding the displaying the in vivo temperature as claimed by Applicant in **Claim 6**, since it is very well known to display a temperature in order to provide the information to the surgeon or medical practitioner when using any type of probe in vivo. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to display the temperature changes sensed at the sensor in order to provide the information to the surgeon.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over **KURANISHI** and **CAZIER** and further in view of **KRILL** (U. S. Patent Application Pub. No. US 2004/0122315 A1).

KURANISHI and **CAZIER** discloses or suggests all the limitations as claimed by Applicant in Claim 5, including the limitation that the environment of intended use is *in-vivo*.

KURANISHI and **CAZIER** as described above, does not teach the image sensor is contained within an autonomous *in-vivo* device.

KURANISHI and **CAZIER**, to summarize, is shown to teach all of the limitations as claimed by Applicant, with the exception of the image sensor being contained within an autonomous *in-vivo* device

KRILL discloses that is known in the art to provide an autonomous *in-vivo* device for carrying an imaging sensor into the body (Paras. 15 and 22).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the image sensor of **KURANISHI** and **CAZIER** with an autonomous *in-vivo* device for carrying the imaging sensor into the body by swallowing (ingestion; Para. 27) in order to avoid making incisions in the body as suggested by KRILL.

KRILL is evidence that ordinary workers in the field of medical diagnostics would recognize the benefit of using an ingestible autonomous *in-vivo* device as taught by KRILL for the imaging sensor of **KURANISHI** and **CAZIER** in order to avoid the need to make incisions for implanting the device in locations in the body.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute ingestible autonomous *in-vivo* device for the probe-type endoscope of **KURANISHI** and **CAZIER** in order to avoid the need to make incisions for implanting the device as taught by KRILL.

7. Claims 2 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over **KURANISHI** in view of **CAZIER.**

KURANISHI discloses a system for calculating a temperature change in vivo, as claimed by Applicant in Claims 2 and 7-8, comprising:

Regarding ***Claim 2:***

an image sensor 31;

an integrating unit 22;

Regarding **Claim 7**: the integrating unit amplifies said dark current noise it samples from the image sensor. There is also communication, the integrating unit including both inputs and outputs, so that information is passed through it, thus it communicates, as claimed by applicant.

Regarding **Claim 8**: the image sensor and said integrating unit 22 are controlled according to an illuminating condition, *e.g.,* Fig.2; shows "ordinary light" is extinguished during the "dark-current' data storage periods, while no light is illuminating the internal tissue (Col. 5, Line 46 through Col. 6, Line 8).

KURANISHI as described above, does not explicitly disclose or teach the system includes a change detector, including the functional limitations "detecting changes between said dark current noise samples and calculating the temperature change in in-vivo according to the changes.

KURANISHI, to summarize, is shown to teach all of the limitations as claimed by Applicant in claims 2, 7 and 8, with the exception of the system including a change detector calculating the temperature change in in-vivo according to the changes between said dark current noise samples.

CAZIER discloses a system for calculating a temperature change in an imaging camera by detecting changes in the sampled dark current of the imager (*e.g.,* CCD photosensors in a digital camera) for calculating temperature of the camera focal plane (Col. 2, Lines 25-60) and further discloses comparing a dark current data sample (I_c) of the sensed dark current noise to a previous sample (I_B) and a step of calculating the temperature change according to the comparison.

CAZIER discloses that calculating temperature of the camera is advantageous for enabling thermal compensation of the lens system of the imager.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the dark current noise provided in the image sensor introduced *in-vivo* of **KURANISHI** by adding a change detector, as suggested by **CAZIER** for calculating the temperature change by sampling the dark current noise and comparing the samples in order to determine the temperature change of the image according to the changes of the dark current noise of the sensor introduced *in-vivo* as taught by **LIST**.

8. Claims 3, 9 and 10 are FINALLY rejected under 35 U.S.C. 103(a) as being unpatentable over **CAZIER** in view of **KRILL**.

CAZIER discloses a method for determining a temperature change in a digital imaging system, the method comprising (Col. 2, Lines 25-60):

sensing the dark current noise of an image sensor (*e.g.,* CCD photosensors in a digital camera);

obtaining dark current data samples of the sensed dark current noise (I_C); and

determining a change in temperature according to the dark current data samples.

CAZIER discloses the change is determined by comparing the sampled dark current noise (I_C) values to the previously measured dark current data (I_B) sampled at a known temperature, so that the change from that temperature is known (Col. 2, Line 40).

Regarding **Claim 10, CAZIER** discloses the image sensor may be a CCD sensor, but does not explicitly disclose the image sensor comprises CMOS. OFFICIAL NOTICE is taken regarding the limitation of Claim 10, wherein the image sensor comprises CMOS, since it is very well known in the art of digital imaging that CMOS Active Pixel Sensors have temperature dependent "KTC" noise that is equivalent dark current noise to the CCD photosensors disclosed by **CAZIER**. Therefore, absent criticality, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute a CMOS imaging device for the CCD imaging device of **CAZIER** since they are art-recognized equivalents for imaging devices.

CAZIER, to summarize, is shown to teach or suggest all of the limitations as claimed by Applicant in **Claims 3 and 10**, with the exception of introducing *in-vivo* the image sensor, and thus, measuring a temperature change in vivo. Also **CAZIER** does not describe the method wherein the image sensor is contained within an autonomous in vivo device, as claimed by Applicant in **Claim 9**.

KRILL discloses that is known in the art to provide an autonomous *in-vivo* device for carrying an imaging sensor into the body (Paras. 15 and 22).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the image sensor of **CAZIER** with an autonomous *in-vivo* device for containing the imaging sensor (Para. 27) in order to measure the temperature while obtaining *in-vivo* images for diagnosis of a medical condition of a living body as suggested by **KRILL**.

KRILL is evidence that ordinary workers in the field of medical diagnostics would recognize the benefit of using an ingestible autonomous *in-vivo* device as taught by **KRILL** for holding the imaging sensor of **CAZIER** in order to avoid the need to make incisions for implanting the device in locations in the body.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute ingestible autonomous *in-vivo* device for the probe-type endoscope of **CAZIER** in order to measure the temperature while obtaining *in-vivo* images for diagnosis of a medical condition of a living body as suggested by **KRILL**.

9. Claims 4 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **KURANISHI** in view of **CAZIER.**

KURANISHI discloses a device for determining a temperature change in vivo, as claimed by Applicant in Claims 4 and 11-12, comprising:

Regarding Claim 4:

an image sensor 31;

a controller (observation-mode changeover switch 21 in combination with the secondary circuit 1) which causes dark current noise of the image sensor to be obtained and sampled (stored in memory 11; Fig. 1) as claimed by Applicant in Claim 4.

Regarding **Claim 11**: the image sensor senses the dark current noise during a dark period (Fig. 3).

Regarding **Claim 12**: the image sensor communicates with said controller during periods when said image sensor is not illuminated (Fig.2; shows "ordinary light" is extinguished during the "dark-current' data storage periods).

KURANISHI as described above, does not explicitly teach the functional limitation of the controller "to determine a change in temperature in-vivo according to the dark current data samples".

KURANISHI, to summarize, is shown to teach all of the limitations as claimed by Applicant in claims 4, 11 and 12, with the exception of the use of the dark current data sample "to determine a change in temperature in-vivo according to the dark current data samples".

CAZIER discloses a device for calculating a temperature change in an imaging camera by detecting changes in the sampled dark current of the imager (*e.g.,* CCD photosensors in a digital camera) for calculating temperature of the camera focal plane (Col. 2, Lines 25-60) and further discloses comparing a dark current data sample (I_C) of the sensed dark current noise to a previous sample (I_B) and a step of calculating the temperature change according to the comparison.

CAZIER discloses that determining temperature of the camera is advantageous for enabling thermal compensation of the lens system of the imager.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the dark current noise provided in the image sensor introduced *in-vivo* of **KURANISHI** by adding a change detector, as suggested by **CAZIER** for calculating the temperature change by sampling the dark current noise and comparing the samples in order to determine the temperature change of the image according to the changes of the dark current noise of the sensor introduced *in-vivo* as taught by **KURANISHI**.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related temperature measurement and imaging devices and methods.

- US 6927795 B1 (Cazier; Robert et al.) also teaches measuring the internal temperature of a camera using the dark current of the photo detector.

- US 20040036776 A1 (Wakabayashi, Tsutomu et al.) discloses an electronic camera including calculating a temperature (relative to a calibration temperature) based on dark current noise of a photodetector (Paragraphs[0033-0031, 0057]).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stanley J. Pruchnic, Jr., whose telephone number is **(571) 272-2248**. The examiner can normally be reached on weekdays (Monday through Friday), the best hours being from 8:30 AM to 4:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez (Art Unit 2859) can be reached at **(571) 272-2245**. The Central FAX Number for *all official USPTO communications* is **571-273-8300**.

Any inquiry of a general nature or relating to the status of this application or proceeding may be directed to the official USPTO website at **http://www.uspto.gov/** or you may call the **USPTO Call Center** at **800-786-9199** or 703-308-4357. The Technology Center 2800 Customer Service FAX phone number is (703) 872-9317.

The cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources.

Private PAIR provides external customers Internet-based access to patent application status and history information as well as the ability to view the scanned images of each customer's own application file folder(s).

For inquiries relating to Patent e-business products and service applications, you may call the *Patent Electronic Business Center (EBC)* at 703-305-3028 or toll free at 866-217-9197 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: **ebc@uspto.gov**. Additional information is available on the Patent EBC Web site at: **http://www.uspto.gov/ebc/index.html**.

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Stanley J. Pruchnic, Jr.
8/20/05